Dissemination of MDV II cooking unit for sustainable living

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ABSTRACT
Traditionally, rural households have been dependent upon biomass fuels. Greater responsibility for women and children in gathering these fuels, low efficiency of usage, deforestation, increasing drudgery and its adverse impact on the health of women are the unfortunate features of the scenario. Women and children are exposed to high levels of indoor air pollution due to use of traditional cooking units. Exposure from biomass smoke is estimated to cause a global death toll of 2.5 million every year equivalent to 4-5 per cent of total global deaths. So a improved cooking unit (MDV cooking unit) developed to overcome these problems was further modified (MDV II) and the MDV II cooking unit was constructed in 12 families of a village who were willing for it .they used it for two months and after that a pre-tested interview schedule was used to collect the data pertaining to feedback on use pattern of MDV II cooking unit. 'Difficulty in procuring grate and plate' and 'expensive' were the most common problems faced by the respondents (Mean score 2). 'Ash is to be removed frequently' got 2nd rank with mean score 1.92. All the respondents felt that there was no need of iron pipe (fucany) to provide additional oxygen which indicates that they were relieved from the problem of smoke generation because of improper burning of fuel. With the use of MDV II cooking unit users were relieved from the problem of smoke generation because of improper burning of fuel. Hence the kitchen with MDV II cooking unit had better sustainable environment in terms of air pollution as compared to kitchen with traditional cooking unit

INTRODUCTION
Energy is a fundamental and strategic tool even to attain the minimum quality of life. Sustainable development of a region depends critically on the health of renewable resources like soil, water, vegetation, livestock and genetic diversity. The integrated development of all these components is essential for environmental richness. The currently inefficient energy use in various sectors is certainly responsible for detrimental impacts on the environment. Around 2.64 billion people or 40 per cent of the world's population, lack modern fuels for cooking and heating while 1.6 billion have no access to electricity, three quarters of them living in rural areas [1].

Humanity's first combustion device is still the most common today, the home hearth. In rural areas of developing countries, where about 40 per cent of all people live, the household stove accounts for more than half of human energy use. In many of the poorest countries, 80 per cent or more of all national fuel combustion occur under cooking pots[2]. Studies, from many countries have indicated that biomass fuel leads to very high levels of indoor air pollution[3], [4], and there is growing concern about the health effects of this exposure, particularly among women and children. Women and children are exposed to high levels of indoor air pollution every year [5]. Exposure from biomass smoke is estimated to cause a global death toll of 2.5 million every year equivalent to 4-5 per cent of total global deaths[6], [7], [8], [9], [10] .

In the context of above facts an improved cooking unit MDV cooking unit was developed by[11]. On the basis of feedback of the users it was modified as MDV II cooking unit and disseminated in rural area.

METHODOLOGY
Mangali village from Hisar district was selected purposively. MDV II cooking unit was constructed in 12 families who were willing for it all the cooking activities were performed on MDV II cooking unit for two months. Pre-tested interview schedule was used to collect the data pertaining to feedback on use pattern of MDV II cooking unit.

The data were coded and tabulated to draw the meaningful inferences. The data were analyzed by employing frequencies, percentages, means, mean scores and ranks.

RESULTS ACHIEVED
Background information of the respondents
Table 1 depicts that majority of the respondents (41.7%) were in age group of 20-35 years, followed by one third in age group of 51-65 years and one fourth in age group of 36-50 years.

One third of the total respondents were illiterate and one fourth of the sample was educated up to X class. Only few (8.30 %) were educated up to secondary school. Majority of the respondents (58.30%) had nuclear family and rest 41.70 per cent had joint family. A thumping majority (58.30%) had 6-9 members in the family followed by one fourth households with 2-5 members in the family and only 16.70 per cent had large family size i.e. 10 or more than ten members. Majority of the respondents (58.30%) were from low caste and one third were from high caste and only 8.30% were from middle caste. The main occupation was farming and agricultural labor (one third each), while one fourth were from service families and very few had business as occupation. Two third of the families were having Rs.10.001 to Rs. 15,000 monthly

income. Monthly income of one fourth of the respondents was more than Rs.15, 000 per month.

Problems faced in use of MDV cooking unit have been presented in table 2. 'Difficulty in procuring grate and plate' and 'expensive' were the most common problems faced by the respondents (Mean score 2). 'Ash is to be removed frequently' got 2nd rank with mean score 1.92. Problem 'only one item can be cooked at a time' and 'decreased working efficiency' got 3rd rank with mean score 1.33.

Other problems faced in decreasing order were 'difficulty in initial burning', 'more time consuming', 'special skill required in construction' and 'more smoke generation'.

Advantages of MDV cooking unit
Table 3 depicts the advantages of MDV cooking unit as perceived by the respondents. 'No need of iron pipe (fucany) to provide additional oxygen' secured 1st rank followed by 'Initial burning is easy' (mean score 1.92); 'Bangles do not get heated up' (mean score 1.67) and 'No special training is required for construction' (mean score 1.58). 'Grate for keeping the fuel is convenient' and 'Can be constructed with available local material'

secured 5th rank. Other advantages perceived by them were 'Reduced amount of smoke ', 'Clean atmosphere', 'No deposition of soot on the utensils' and 'Flame concentration plate reduced on the top of the wood stove is convenient' each with 6th rank (mean score 1.42). The advantages 'liked the appearance of the MDV cooking unit', 'convenient to use' and 'remains warm for longer time as compared to traditional cooking unit' secured 7th rank each with mean score of 1.33. The last rank was achieved by 'Less fuel consumption, so less expensive' and 'Saves time, energy and fuel' (mean score 1.08). All the respondents felt that there was no need of iron pipe (*fucany)* to provide additional oxygen which indicates that they were relieved from the problem of smoke generation because of improper burning of fuel.

CONCLUSION
They were relieved from the problem of smoke generation because of improper burning of fuel. Hence the kitchen with MDV II cooking unit had better sustainable environment in terms of air pollution as compared to kitchen with traditional *cooking unit*.

Table 1: General background information of the respondents   **n=100**

Characteristic	Categories	Frequency	Percentage
Age (in years)	20-35	5	41. 7
	36-50	3	25.0
	51-65	4	33.3
Education	Illiterate	4	33.3
	Primary	2	16. 7
	Middle	3	25.0
	High School	2	16. 7
	Secondary School	1	08.3
Family type	Joint	5	41. 7
	Nuclear	7	58.3
Family size	2-5 members	3	25.0
	6-9 members	7	58.3
	10 and above	2	16. 7
Caste	Low	7	58.3
	Middle	1	08.3
	High	4	33.3
Family occupation	Farming	4	33.3
	Agriculture labor	4	33.3
	Service	3	25.0
	Business	1	08.3
Family income/ month (Rs.)	5,000/- to 10,000/-	1	08.3
	10,001/- to 15,000/-	8	66.7
	More than 15,000/-	3	25.0

Table 2: Problems in use of MDV n=12*cooking unit*

	Problems	Mean score	Rank
1	Difficulty in initial burning	1.25	IV
2	Ash is to be removed frequently	1.92	II
3	More time consuming	1.16	V
4	More smoke generation	1.09	VI
5	Only one item can be cooked at one time	1.33	III
6	Decreased working efficiency	1.33	III
7	Difficulty to procure grate and plate	2.00	I
8	Special skill required in construction	1.16	V
9	Expensive	2.00	I
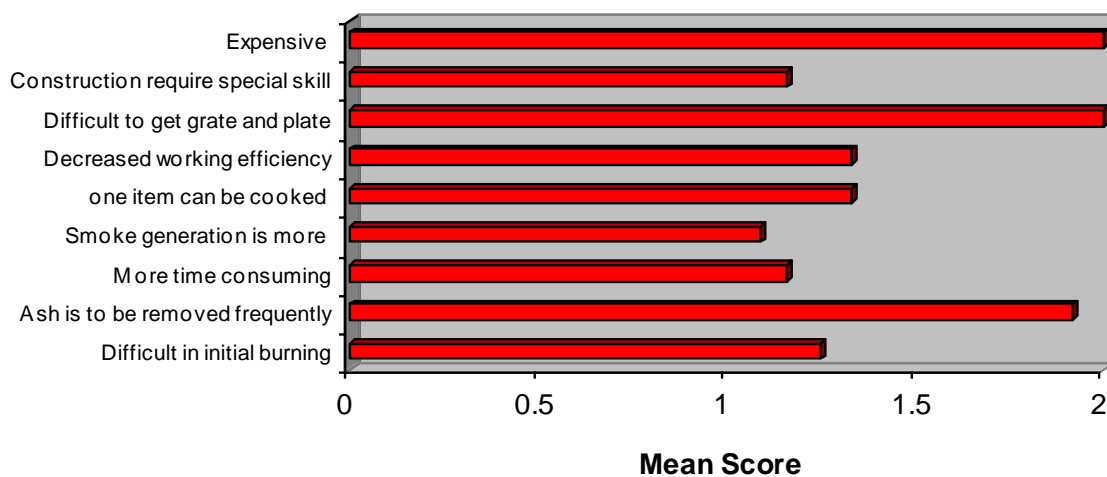
Fig 1: problems of MDV Chulha

Table 3: Advantages of MDV cooking unit   n=12

Advantages	Mean score	Rank
Less fuel consumption, so less expensive	1.08	VIII
Liked the appearance of the MDV cooking unit	1.33	VII
Quantity of smoke is reduced	1.42	VI
Flame concentration plate on the top of the wood stove is convenient	1.42	VI
Grate for keeping the fuel is convenient	1.5	V
Saves time, energy and fuel	1.08	VIII
Initial burning is easy	1.92	II
No need of iron pipe (*fucany*) to provide additional oxygen	2.0	I
Can be constructed with available local material	1.5	V
No special training is required for construction	1.58	IV
No deposition of soot on the utensils	1.42	VI
MDV cooking unit remains warm for longer time as compared to traditional *cooking unit*	1.33	VII
Convenient to use	1.33	VII
Clean atmosphere	1.42	VI
Bangles do not get heated up	1.67	III

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